

Ethanol

What it is and where it is used

Ethanol is ethyl alcohol: a fuel produced from renewable resources. It is made mainly from corn but can also be made from wheat, barley, sorghum, sugarcane, etc. Current research is also investigating the use of cellulosic feedstocks, which include switchgrass, cornstalks, and paper pulp to produce ethanol.

Ethanol can be blended with gasoline to make a motor fuel. Terminology to describe ethanol and its gasoline blends is often used interchangeably and can be easily confused. The three terms below are all sometimes referred to as ethanol or gasohol:

Ethanol is the 100 percent pure ethanol coming from the production facility.

- E10 is the blend of 10 percent ethanol and 90 percent gasoline.
- E15 is the blend of 15 percent ethanol and 85 percent gasoline.
- E85 is the blend of 85 percent ethanol and 15 percent gasoline.

What it is not

Ethanol is not biodiesel. For more information on biodiesel, see the biodiesel fact sheet.

Use of ethanol blends

- Blends of E10 or lower are often used as fuel oxygenates to reduce vehicle emissions. These blends can be used in most post-1983 cars without adverse effects on the vehicle.
- Blends of E15 or lower are often used as fuel oxygenates to reduce vehicle emissions. These blends can be used in light-duty vehicles with a model year 2001 or later without adverse effects on the vehicle.
- E85 can only be used in flexible-fuel vehicles (FFVs). FFVs can run on gasoline or E85. Using E85 in FFVs decreases fuel economy by up to 30 percent but it also reduces some exhaust emissions. Many consumers are unaware their vehicle is an FFV. An FFV will be marked on the inside of the fuel cover or by a logo elsewhere on the vehicle. A list of current year FFVs can be found at www.afdc.energy.gov/vehicles/search/download.pdf?fuel=e85_gsln. Always double-check the vehicle's owner manual.

Emissions from ethanol blends/environmental effects

Use of E85 can reduce many exhaust emissions, though the actual emissions will vary with engine design. These numbers reflect the potential reductions offered by E85 relative to conventional gasoline:



- Reductions in volatile organic compounds (VOCs) emissions of 15 percent.
- Reductions in carbon monoxide (CO) emissions of 40 percent.
- Reductions in particulate matter (PM) emissions of 20 percent.
- Reductions in nitrogen oxides (NOx) emissions of 10 percent.
- Reductions in sulfate emissions of 80 percent.

Ethanol production facilities

While ethanol production facilities are often considered good for the economy, many other factors should be considered by communities interested in allowing the construction of these facilities.

- Ethanol production facilities consume and discharge large amounts of water. Questions about water quality issues can be directed to DEQ's Water Quality Division at **405-702-8100**.
- While ethanol and its blends are considered by many to be environmentally friendly in comparison to petroleum refineries, ethanol plants also release pollutants into the air.

Permitting Ethanol Production Facilities

- Facilities with emissions under 40 tons per year (TPY) of criteria air pollutants, under 25 TPY of combined hazardous air pollutants (HAPs), and under 10 TPY of any single HAP, are generally permit-exempt, unless they are subject to an emission, equipment, or work practice standard under NSPS (New Source Performance Standard) or NESHAP (National Emissions Standards for Hazardous Air Pollutants).
- DEQ's Air Quality Division (AQD) operates a dual permitting system, meaning that it issues both construction and operating permits to eligible facilities.
- A construction permit is required before a new source is constructed or before an existing source is modified. The construction permit is issued after it is determined the source is designed to comply with all applicable rules and pre-construction requirements.
- An operating permit is issued after construction is completed and demonstration is made that the source is capable of meeting applicable emissions limitations and air pollution control requirements. Permits are further classified as either major, synthetic minor, or minor, based on the source's potential-to-emit (PTE) different air pollutants.
- A major source, requiring a major source permit, is any source • with a PTE of 100 TPY or more of any criteria air pollutant, 10 TPY or more of any one HAP, or 25 TPY or more of any combination of HAPs.
- A minor source, requiring a synthetic minor or a minor source permit, is any source that does not meet the major source definition.
- If you are not sure you need a permit, you should request an Applicability Determination (AD) from DEQ's AQD staff. The AD is a written document issued by the DEQ to determine whether a particular source or operation is subject to the requirements of a rule, including whether or not you need a permit. If you need a permit, the fee for the AD is credited towards the permit fee.

Contacts

For general information on ethanol, or for permitting information for ethanol production facilities, contact DEQ's AQD at **405-702-4100**.

Links for more information

- Environmental Protection Agency
www.epa.gov/renewable-fuel-standard-program
- Central Oklahoma Clean Cities Coalition
www.okcleancities.org
- Tulsa Area Clean Cities
www.tulsacleancities.com
- National Renewable Energy Laboratory
www.nrel.gov/transportation/fleetttest-fuels.html
- Alternative Fuels Data Center
www.afdc.energy.gov/fuels/ethanol
- Growth Energy
www.growthenergy.org
- American Coalition for Ethanol
www.ethanol.org
- U.S. Energy Information Administration
www.eia.gov/energyexplained/biofuels/ethanol.php